

What is claimed is:

1. A hydraulic raising apparatus with automatic regulated speeds comprising:

5 a working hydraulic cylinder 1 that is provided therein with a piston rod  
2 and of which the interior is divided into a rodless side chamber 11 and  
a piston rod side chamber 12; said rodless side chamber 11 being  
connected to said piston rod side chamber 12 via a hydraulic circuit 14  
with a check valve 141 that restricts hydraulic liquid flow in a single  
10 direction from said piston rod side chamber 12 to said rodless side  
chamber 11; said piston rod side chamber 12 being connected to a  
reservoir 4 through another hydraulic circuit 15 and a relief valve 7; said  
piston rod side chamber 12 being provided with a supply circuit 16 and a  
check valve 161 through which the hydraulic liquid of said reservoir 4  
can flow into the piston rod side chamber 12 for replenishment; said  
15 rodless side chamber 11 being connected to the reservoir 4 through a  
return circuit 17 and a return valve 5; and

a hydraulic pump 3 that is provided therein a piston rod 30 and of which  
the interior is divided into a rodless side chamber 31 and a piston rod  
side chamber 32; two oil channels 33 and 34 connecting said piston rod  
20 side chamber 32 with said rodless side chamber 31 through an adjustable  
relief valve 331 and a check valve 341 respectively so that the hydraulic  
fluid flow from said rodless side chamber 31 to said piston rod side  
chamber 32 must pass through said adjustable relief valve 331 and said  
oil channel 33 and the hydraulic fluid flow from said piston rod side  
25 chamber 32 to said rodless side chamber 31 must pass through said oil

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channel 34 and said check valve 341 in a single direction; said hydraulic pump 3 being connected to said reservoir 4 through a hydraulic circuit 35 and a check valve 351 which restricts hydraulic fluid flow in a single direction from the reservoir 4 to the pump 3; said working hydraulic cylinder 1 being connected to said pump 3 via an inlet circuit 8 with a safety valve 6;

and characterized in that said working hydraulic cylinder can alter its working modes in said hydraulic circuits from a piston type to a spool type and vice versa to automatically adjust its raising speeds for various load conditions through said hydraulic circuit 14 and said check valve 141 interposed between said rodless side chamber 11 and said piston rod side chamber 12, and through the supply circuit 16, the check valve 161, the hydraulic circuit 15 and the relief valve 7 disposed between the piston rod side chamber 32 in conjunction with said two oil channels 33 and 34 implanted between said piston rod side chamber 32 of said pump 3 and said rodless side chamber 31.

2. The hydraulic raising apparatus with automatic regulated speeds as claimed in claim 1 wherein the inlet circuit 35 of said pump 3 is composed of an annular groove 352 formed on the inner wall of the piston rod side chamber 32 of the pump 3 and a side channel 353 connected to the annular groove 32.

3. The hydraulic raising apparatus with automatic regulated speeds as claimed in claim 1 wherein said hydraulic circuit 14 between the rodless side chamber 11 of the cylinder 1 and the piston rod side chamber 12 is formed on the rear end of the piston rod 2 to connect the rodless side

chamber 11 with the piston rod side chamber 12 and is provided with a check valve 14 that restricts hydraulic fluid flow in a single direction from the piston rod side chamber 12 to the rodless side chamber 11.

4. The hydraulic raising apparatus with automatic regulated speeds as  
5 claimed in claim 1 wherein the hydraulic circuit 15 and the supply circuit 16 connected to the piston rod side chamber 12 of the cylinder 1 are constructed on the front block 101 of the cylinder 1 and are individually provided with a relief valve 7 and a check valve 161.

5. The hydraulic raising apparatus with automatic regulated speeds as  
10 claimed in claim 1 wherein said hydraulic cylinder can be multiple-staged by using a corresponding multiple-staged piston rod and a rodless side chamber 11A and a plurality of piston rod side chambers 12A, 12B; each chamber 11A, 12A, 12B being connected to another chamber via a hydraulic circuit 14A, 14B that includes a check valve 141A, 141B and  
15 connected to a reservoir 4A via another hydraulic circuit 15A, 15B and another check valve 7A, 7B; each piston rod side chamber 12A, 12B being connected to a supply circuit and a check valve for acquiring oil replenishment from a reservoir 4A and said rodless side chamber 11A also being connected to the reservoir 4A via a return circuit and a return  
20 valve.

6. The hydraulic raising apparatus with automatic regulated speeds as  
claimed in claim 1 wherein said hydraulic pump can be multiple-staged  
by using a corresponding multiple-staged piston rod and a rodless side  
chamber 31A and a plurality of piston rod side chambers 32A, 32B;  
25 between said rodless side chamber 31A and the first piston rod side

chamber 32A, the first piston rod side chamber 32A and the second piston rod side chamber 32B and each pair of other adjacent piston rod side chambers being respectively provided with two hydraulic circuits 33A and 34A, 33B and 34B, each of which includes an adjustable relief valves 331A, 331B and a check valve 341A, 341B that restrict hydraulic fluid flow from the rodless side chamber 31A to the first piston rod side chamber 32A, or from the second piston rod side chamber 32B to the first piston rod side chamber 32A, and other hydraulic fluid flows between two adjacent piston rod side chambers in a single direction.

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